

SPATIAL DIVERSIFICATION  
OF  
MANUFACTURING INDUSTRIES

(A STUDY OF FACTORY INDUSTRIES IN UTTAR PRADESH)

T. S. PAPOLA

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### Prefatory Note

This paper forms part of a larger study on the subject being carried out at the Giri Institute of Development Studies, with the financial support from the Indian Council of Social Science Research. It portrays the locational pattern of factory units in Uttar Pradesh, particularly of those established during 1960-1975, assesses trends in diversification and attempts a preliminary analysis of these trends in terms of some macro-characteristics of the districts. Detailed analysis of factors in location and impact of official programmes in this regard will be attempted at a later stage on the basis of information currently being collected in a State wide survey among factory units.

Data on factories and employment used in the paper have been collected from the Office of the Chief Inspector of Factories, Uttar Pradesh, Kanpur. My colleagues Saryashri Ashutosh Joshi, A.P. Tewari, V.K. Goel, J.P. Misra and Kumari Vijayalaximi Chari assisted in the collection and analysis of data.

Dr A.K. Singh, Shri Bhanwar Singh and Shri R.C. Sinha went through the draft of the paper and made many useful suggestions, some of which have been incorporated in this paper while others will be usefully followed up in the subsequent stages of the study.

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SPATIAL DIVERSIFICATION OF MANUFACTURING INDUSTRIES:  
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T.S. Papola

Location and dispersal of economic activity among different units of space has been a subject of great analytical and policy significance. For a long time the theoretical analysis of the problem was carried out in relatively simple framework: natural endowment of a location represented in the availability of basic raw materials, and nearness to the market were presumed to explain the spatial variations in the location of economic activity. The framework has a logical appeal even today but its predictive power has significantly declined, and would require substantial modifications with a view to maintaining its high explanatory power. The traditional theories of location and spatial diversification were formulated in a period when the industrial structures of most of the spatial units were still dominated by natural resource based and directly consumer oriented industries. The optimum location of any economic activity was simply determined by the balance between the location and weight-distance characteristics of the material and output. If the transport charges per unit of weight-distance did not significantly differ, as happened most of the time, the end-locations provided the optimum: the

activities requiring weight losing materials got located at the raw material head and those requiring weight gaining material and careful and costly transport of final output got located nearer the market. Thus we have sugar factories located near sugar cane fields, and aerated soft drink plants located near the market.

The changes in the structure of industries that have taken place, specially over the last half century, however, make it extremely difficult to classify them in terms of locational characteristics in the simple dichotomous scheme, and analyse them with the help of merely the location and weight characteristics of raw material and market. First, the industrial structure has acquired an increasing proportion of such industries which are not predominantly natural resource and raw material based. Second, processes of production have so changed that many units do not use nature-based raw material but semi-processed or intermediate products as the major input in their production; while, therefore, a number of others do not produce for the final consumer, but only for other producers. Third, with the change in technology, organisation and size of production units, factors such as infrastructure, power, cheap and 'submissive' labour force, finance etc., have become equally, if not more, important

along with the raw material supply and the market. Fourth, the marketing system has also undergone changes with large scale production : a linear treatment of distance to market is too simplistic a tool to take care of the increasingly large number of space units providing the market; and many of the producers do not directly sell to the consumer, therefore, what is of immediate importance is not the location of the market as such but availability of marketing arrangements and networks. As a result of all this, we do not find all metal-based industries located around the iron ore and other metal mines, nor do we find all factories producing agricultural machinery and implements located in the rural agricultural areas. Availability of transport facilities (not just the transport cost), infrastructure facilities, finance, industrial agglomerations to procure and sell intermediate products, and marketing network seem to have emerged as significant factors in locations, sometimes overshadowing the importance of the basic raw material and the ultimate market.

Still, the traditional cost-revenue framework can take care of most of these complications to the extent the assumption that an entrepreneur aims at profit-maximising location holds. There could, however, be several reasons as to why this assumption does not hold. The entrepreneur may have his personal,

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non-pecuniary preferences for a location which is not necessarily the maximum profit location. There may be in operation certain policy instruments either inducing entrepreneurs to go to less favoured locations by providing pecuniary attraction or forcing them away from industrially developed areas by prohibiting opening up of new units and expansion of old ones in such areas. In an economy primarily based on private enterprise, the policy instruments may have to be basically of a compensating nature : most of the time an entrepreneur may have to be given adequate pecuniary compensation to mitigate the cost and profit disadvantage and loss of amenities of life that a particular less favoured location offers.

### The Problem

A realistic analysis of location pattern of industries would, however, be required to shed a number of restrictive conditions of the 'pure' economic theory of location. First, a larger number of variables than merely the location and weight characteristics of material and output, and location of market, need to be included in the explanatory framework. It is obvious that the traditional assumption that the transport cost of material and output alone makes the differences is not valid, as even the 'ubiquities' are not always available at the same price due to differences



in the demand-supply conditions of non-movable factors like land, and to the relative lack of mobility even among the mobile factors like labour. On the other hand, certain materials, mainly universal intermediaries like cement and steel, sometimes assume the nature of 'ubiquities', as a result of the government policy of making them available at the same price irrespective of the transport cost incurred to reach them at different locations. An analytical framework to explain the pattern of industrial location needs, therefore, to be evolved through indepth empirical studies, which could take care of the aforesaid variables and propositions.

The problem has assumed special significance from the policy viewpoint with the acceptance of inter-regional balance and development of backward areas as important objectives of economic and industrial policy. Industrial policy in India has emphasized this aspect continuously since mid-fifties. A panel appointed by Government of India classified regions and districts of the country into industrially backward and non-backward ones and another panel recommended policy instruments, particularly in terms of incentives and subsidies to be offered to entrepreneurs who locate their units in the backward areas. The Central and State governments

have evolved a number of programmes and instruments to diversify industries in favour of backward areas. Location of some large public undertakings in backward regions, industrial estates programme, central capital subsidy, tax concessions, concessional terms of loan assistance and raw material and marketing assistance are some of the important instruments used for achieving the objectives of diversification, and industrial development of backward areas. Besides, the licensing authorities are also expected to consider backward area location as a favourable factor in deciding on licence application.

There are two main interrelated issues which are of our concern in the present study of location of factories in Uttar Pradesh : One, an examination of the adequacy of the traditional analysis of location to explain the pattern of industrial location; and two, an assessment of the impact of policy instruments on the pattern of industrial location in the State. The vast geographical area of the State and extreme variations in levels of industrial activity, provide a good enough scope for examining the propositions outlined above. And extremely low levels of development in general, in the regions with very low levels of industrial activity makes such a study useful from policy viewpoint as well.

Specifically, the study attempts (a) a portrayal of the spatial pattern of industries among various districts and regions; (b) an analysis of the pattern of location of new factories which have been started during 1960-75; (c) an analysis of the factors in location of units in various industries and (d) an assessment of the effectiveness of various measures for industrial diversification and industrial development of backward districts. While the detailed examination of the factors of location and effectiveness of incentives, subsidies and assistance in influencing location will be made on the basis of data currently being collected from a sample of around 400 factories in a number of industries and districts, the present paper reports the result of analysis of the number of factories and factory employment in various districts at two points of time 1960 and 1975. It deals with the growth and structure, spatial distribution of units and employment in the two years and also of the increase during the intervening period, industrial base and specialisation of districts, locational linkages among industries, relationship between initial and incremental industrial activity and an analysis of location in terms of some macro-variables. Some tentative conclusions have also been drawn on the trends in location and policy instruments on the industrial development of backward districts.



### Growth and Structure of Industries

During the fifteen year period (1960-1975), the number of registered factories in Uttar Pradesh has increased from 2472 to 4517, and factory employment from 268970 to 406940: average annual rate of growth of factories works out to 5.48 per cent and of factory employment 3.43. These rates compare quite well with the all-India growth rates of 6 per cent in number of factories and 2.5 per cent in factory employment during the same period. Among individual industries of some significance (say, employing at least 1 per cent of the total factory workers in the State in 1960 or 1975) relatively fast growth has been registered by tobacco products, rubber products, basic chemicals including fertilisers, glass and glass products, iron and steel, non-ferrous metals (aluminium), metal products, electrical machinery, manufacture of motor vehicles, electricity, chemical products, dairy products, paper and paper products and printing and publishing. Sugar, leather tanneries and machinery and machine tools have grown but at a slow pace, while factory employment in spinning and weaving of textiles, grain mill products, manufacture of boots and shoes and manufacture of rail road equipment etc., registered an absolute decline.

Table 1 : Major Industries in Uttar Pradesh : Factory Sector (1960 & 1975)

| Industry-<br>Code | Industry description                                    | No. of<br>factories |      | Employment    |               |        |        |
|-------------------|---|---------------------|------|---------------|---------------|--------|--------|
|                   |   | 1960                | 1975 | % in<br>total | % in<br>total |        |        |
| 231               | Spinning and Weaving of textiles                        | 96                  | 184  | 63828         | 23.73         | 57776  | 14.68  |
| 207               | Sugar factories and refineries                          | 304                 | 766  | 60561         | 22.51         | 79821  | 20.29  |
| 382               | Manufacturing, repair of rail road equipment            | 18                  | 18   | 25305         | 9.41          | 28712  | 7.06   |
| 332               | Manufacture of glass and glass products                 | 191                 | 260  | 14856         | 5.52          | 37826  | 9.61   |
| 360               | Machinery (except electrical machinery)                 | 251                 | 267  | 13524         | 5.03          | 14704  | 3.73   |
| 384               | Repair of motor vehicles and cycles                     | 111                 | 157  | 13264         | 4.93          | 19443  | 4.94   |
| 280               | Printing and publishing                                 | 208                 | 207  | 9947          | 3.70          | 17988  | 4.57   |
| 209               | Miscellaneous food products                             | 138                 | 197  | 7931          | 2.95          | 8029   | 2.04   |
| 341               | Manufacture of iron and steel                           | 83                  | 423  | 5808          | 2.16          | 17828  | 4.53   |
| 350               | Manufacture of metal products                           | 139                 | 462  | 5432          | 2.02          | 14710  | 3.74   |
| 511               | Electric light and power                                | 63                  | 57   | 5098          | 1.89          | 10782  | 2.74   |
| 205               | Manufacture of grain mill products                      | 262                 | 233  | 4929          | 1.83          | 4141   | 1.05   |
| 241               | Manufacture of boots and shoes (except rubber footwear) | 39                  | 27   | 3979          | 1.48          | 3928   | 0.97   |
| 291               | Tanneries and leather finishing                         | 31                  | 85   | 3218          | 1.20          | 4210   | 1.07   |
| 311               | Basic chemicals including fertilisers                   | 24                  | 109  | 2530          | 0.94          | 8706   | 2.21   |
| 319               | Miscellaneous chemical products                         | 46                  | 136  | 2129          | 0.79          | 6544   | 1.66   |
| 271               | Pulp paper and paper board mills                        | 14                  | 70   | 1586          | 0.59          | 4402   | 1.12   |
| 342               | Non-ferrous metal (aluminium etc.)                      | 29                  | 70   | 1124          | 0.42          | 7883   | 2.00   |
| 370               | Electrical machinery, apparatus etc.                    | 17                  | 125  | 827           | 0.31          | 9847   | 2.50   |
| 220               | Tobacco manufacture                                     | 7                   | 26   | 382           | 0.14          | 11475  | 2.92   |
| 202               | Manufacture of dairy products                           | 7                   | 14   | 383           | 0.14          | 4100   | 1.04   |
| 300               | Rubber and rubber products and plastics                 | 5                   | 106  | 56            | 0.02          | 4472   | 1.10   |
| 383               | Non-ferrous metal (aluminium etc.)                      | 29                  | 70   | 1124          | 0.42          | 7883   | 2.00   |
| ALL INDUSTRIES    |   | 2472                | 4517 | 268970        | 100.00        | 406940 | 100.00 |

(Industry-wise details are given only of such industry groups which contributed at least one per cent of factory employment in 1960 or 1975).

As a result of these varying growth rates among different industry groups, there has occurred significant structural changes in the manufacturing activities in the factory sector of the State. In 1960, there were only 14 industry groups (at three-digit level of standard industrial classification) contributing at least one per cent each of the total factory employment; and these groups together claimed 88.33 per cent of total employment in all the 60 industry groups that existed in the State in that year. In 1975, the same group of 14 industries claimed 78.25 per cent of total factory employment; and another nine industry groups emerged significant (i.e. employing at least one per cent of total factory workers). Thus there were 23 significant industry groups in 1975 contributing together 94 per cent of total employment. Further the two most important industries, namely, textiles and sugar/<sup>which</sup> contributed 56 percent of total employment in 1960, claimed only 35 per cent of it in 1975; and the top 5 industries (rail road equipment, glass and machinery, besides the above two), contributed 52 per cent of employment in 1975 as against 76 per cent in 1960. This can certainly be considered as a major shift in the industrial economy of the State.

Broadly the industrial structure of the State consists of three sectors of, more or less, equal importance : industries based on agricultural, animal husbandry and forestry raw material; capital and intermediate products industries; and



consumer goods industries. These three groups contributed number of factories and employment in the following proportions in 1960 and 1975.

Table 2 : Distribution of Factories and Employment (percentages) by Broad Industries Categories

| Sector   | Factories |        | Employment |        |
|--|-----------|--------|------------|--------|
|  | 1960      | 1975   | 1960       | 1975   |
| I Agro-based, animal husbandry and forest based industries | 34.64     | 34.81  | 31.04      | 29.18  |
| II Capital and intermediate goods                          | 39.38     | 41.43  | 31.84      | 40.08  |
| III Consumer goods not dependent on local raw material     | 26.01     | 24.08  | 37.08      | 30.78  |
| TOTAL  | 100.00    | 100.00 | 100.00     | 100.00 |

While there does not seem to have occurred a significant shift in relative proportions of factories among the three groups, the capital and intermediate products group has gained and consumer goods sector has lost relative grounds. There has also occurred a marginal decline in the relative position of raw material based industries.

Looking into the cases of individual industries there found to have occurred more significant changes. In the group

of industries using agriculture, animal husbandry and forest based raw material, dairy products, bakery products, tobacco products, ropes and twines, pulp, paper and paper board, non-edible oils, soft drinks and carbonated water have increased their relative importance even though most of them still continue to be minor industries in the State. On the other hand, grain mills, breweries and tanneries have relatively lost. Sugar, the main industry of this group has also not been able to retain its share in total factory employment and claimed 20.29 per cent in 1975 as against 22.51 in 1960. The group as a whole shows emergence and faster growth of the new products group and relatively slow growth of the traditional industries.

In the group of capital and intermediate products most of the industries have improved their relative position, but chemicals (including fertilisers), iron and steel, non-ferrous metals, and electrical machinery, printing and publishing, and rubber products (mainly tyres) have experienced major gains. General machinery and rail road equipment experienced decline in their relative shares, but still maintained a position of dominance in the group, while manufacture and repair of motor vehicles maintained its share of around 5 per cent in total factory employment.

In the group of consumer goods industries, not based on raw materials from the primary sector in the State, textile

spinning, weaving and finishing industry has suffered not only relatively but also absolutely. It has yielded its place as the most important factory industry in the State to sugar; it has experienced an absolute decline of over 6000 in factory employment and it contributed only 15 per cent of factory employment in the State in 1975 as compared to 24 per cent in 1960. Manufacture of boots and shoes, another significant industry in this group also seems on the decline. On the other hand, glass products industry has gained substantially in absolute and relative terms and claimed as much as 10 per cent of total factory employment in the State in 1975. Metal based consumer products, however, have shown fast growth and have come up to claim 10 per cent of factories and 4 per cent of factory employment in 1975.

#### Spatial Structure

There, however, seems hardly any significant change in the overall spatial pattern of manufacturing activities in the State during this period. No doubt, the most industrialised district, namely, Kanpur now claims only 17 per cent of total factory employment in the State as compared to 26 per cent in 1960. But the gains of this relative decline have gone only to some other industrially better developed districts. So that the five districts with the largest factory employment in the State, namely, Kanpur, Meerut, Lucknow, Agra and Gorakhpur,

alone had 57 per cent of the total employment in 1960 and 55 per cent in 1975. Among themselves their relative positions have shifted, Lucknow and Meerut have gained, Kanpur and Gorakhpur have had a relative decline in their shares and Agra has maintained its position with some improvement. At the bottom the 10 industrially least developed districts, namely, Rai Bareli, Pratapgarh, Ballia, Sultanpur, Jalaun, Tehri Garhwal, Hamirpur, Baduan, Garhwal and Banda together shared 1.10 per cent of States' factory employment in 1960; in 1975 their share has been reduced to 0.56 per cent! Overall the Gini coefficient of district-wise distribution of factory employment worked out to 0.6787 in 1960 and 0.6806 in 1975.

Pattern of distribution by the five regions - Eastern, Central, Western, Buldelkhand and Hills - also reveals a similar story. These five regions had 19.56, 37.16, 38.94, 1.75 and 2.62 per cent of State's factory employment in 1960; the respective percentages for 1975 are : 17.93, 26.23, 49.27, 3.12 and 3.22 respectively. Of the additional factory employment generated during 1960-75, 69.4 per cent went to the Western region (19.61 per cent to Meerut and 19.34 per cent to Agra), 14.75 per cent to Eastern region (7.37 per cent to Mirzapur, 3.80 per cent to Allahabad and 2.63 per cent to Varanasi); 5.79 per cent to Bundelkhand (practically all to Jhansi), 4.93 per cent to Central region (3.93 per cent to Lucknow alone) and



4.39 per cent to Hill region (3.22 per cent to Dehradun alone). Bahraich, Basti, Deoria, Jaunpur, Barabanki, Kanpur, Kheri, Banda, Hamirpur, Almora (including Pithoragarh), Garhwal (including Chamoli), Tehri Garhwal (including Uttar Kashi), Bulandsahr, Farrukhabad and Mainpuri experienced an absolute decline in factory employment in 1975 over 1960.

It is also worthwhile to examine the distribution of industrial activity between the notified 'backward' districts and others. Thirty nine of the 56 districts of the State are notified as industrially backward and six (seven) districts (Almora, Ballia, Basti, Faizabad, Jhansi (including Lalitpur) and Rae Bareli) as specially backward. A number of concessions and incentives are available to units in these districts. Most of the term loans provided by the term lending institutions and also the State Government Sales Tax Refund Loans are available in backward districts on concessional terms. Exemption is also provided from income tax, octroi duty, sales tax, electricity duty etc., under certain conditions and for a specific period of time. In specially backward districts units are also eligible for an outright subsidy to the extent of 15 per cent of their capital investment, from the Central Government. In view of all this it would be reasonable to expect that these districts would attract a larger percentage of incremental industrial activity than they obtained in the base year.



This expectation is, however, not found to have been fulfilled. In fact, the position of the notified backward districts has somewhat deteriorated. Given the fact that almost three-fourths of the State's districts are in the backward category, a share as low as 18 per cent in factory units and 15 per cent in factory employment indicated a very high inequality of distribution of industrial activity across the districts in 1960. In 1975, the situation has worsened as the share of these districts has declined slightly in factory units and by over two percentage points in employment.

Table 3 : Distribution of Activities Between Backward and Non-backward Districts(%)

|                                    | Factories        |                           |        | Factory employment |                           |        |
|------------------------------------|------------------|---------------------------|--------|--------------------|---------------------------|--------|
|                                    | Back-ward Dists. | Specially backward Dists. | Others | Back-ward Dists.   | Specially backward Dists. | Others |
| 1960                               | 17.77            | 2.79                      | 82.33  | 15.34              | 3.21                      | 84.66  |
| 1975                               | 17.32            | 1.91                      | 82.68  | 13.22              | 4.36                      | 86.78  |
| Share in increase during 1960-1975 | 16.97            | 0.87                      | 83.03  | 9.14               | 6.59                      | 91.86  |

The 'specially' backward districts experienced an increase in their employment share but it seems to have mostly been contributed by expansion in old units rather than by establishment of

new factories. It is interesting to note that the notified backward districts which have attracted a significant proportion (around 1% or more) of the new factories are not so backward and adjoin some industrially better developed districts as can be seen from Table 4. In fact, five of the eight such districts are in the Western Uttar Pradesh, a generally and industrially better developed region. Thus the major part of

Table 4 : Location of Backward Districts Claiming Significant Number of Factories

| Backward District<br>claiming significant<br>% of new factories | % of new<br>factories<br>claimed | Bordering or neighbour<br>non-backward districts |
|---|----------------------------------|--|
| 1. Azamgarh   | 2.15                             | Gorakhpur, Varanasi                              |
| 2. Unnao  | 2.01                             | Lucknow, Kanpur                                  |
| 3. Sitapur  | 0.98                             | Lucknow, Kheri                                   |
| 4. Etawah   | 0.90                             | Kanpur   |
| 5. Mathura  | 2.01                             | Agra, Aligarh                                    |
| 6. Moradabad  | 5.33                             | Meerut, Bareilly, Bijnor                         |
| 7. Rampur   | 1.03                             | Bareilly, Nainital                               |
| 8. Shajahanpur  | 2.30                             | Bareilly, Kheri                                  |

the new industrial activity going to the group of backward districts, seems to have got concentrated in such backward districts which are in the proximity of some better developed non-backward district. It looks that incentives and concessions

tend to act as inducement more in such districts than in the really backward and remote districts, may be because the latter present a much more disadvantageous position than the backward districts in the proximity of some developed ones.

The highly uneven distribution of industrial activity among districts has roots in the historical evolution of industries in the past, particularly in the dominance of raw material based industries in the industrial structure and differences in the districts' endowments. Today, however, the State's industrial sector is very well diversified and a large part of its industrial activity is not necessarily based on local raw material or demand as such. The footloose industries which do not have any particular locational advantage in terms of raw material availability in one region as compared to others are the ones which have increased in relative importance over the last two decades. It is, therefore, disappointing to find that there has been no significant trend towards spatial diversification of manufacturing activity in the State. 3116

That the State's industrial structure today has a very high degree of locational flexibility is evident from the fact that of the twenty most important industries in the State, as many as 16 have their units located in more than ten districts, mostly in different parts of the State. For example, spinning and weaving of textiles, the second largest factory industry of

the State contributing around 15 per cent of employment in this sector is located in as many as 27 districts spread over the entire State. The most important industry, sugar, however, is a raw material based industry, and does not provide much locational flexibility. Still it has factories in 35 districts, but employment in this industry in the Eastern district has not kept up with the overall growth of industry in the State. Glass and glass products, another important and fast growing industry, has also its factories located in quite a few (15) districts. Among other important industries repair of motor vehicles has factories in 42 districts, miscellaneous food products in 38 districts, basic metals in 27 districts, metal products in 18 districts, electrical machinery in 15 districts, basic chemicals in 23 districts and non-ferrous metal products in 18 districts. Thus the State's industrial structure seems to have a good potential for locational diversification among various districts and regions.

#### Industrial Base and Specialisation of Districts

Before we attempt an analysis of factors responsible for leading to the uneven distribution of new industrial activity, we would like to probe into some aspects of the locational structure of manufacturing activity a little further in terms of the districts' pattern of manufacturing activity and their industrial base and specialisation.

In the first instance, we tried to look at the specialisation pattern of districts, with the help of coefficients of specialisation for each district. Besides indicating how different a district's industrial pattern is from that of the State as a whole, a comparison of coefficients for 1960 and 1975 also suggests whether the district's industrial pattern has become more diversified or concentrated over the period. The coefficient of specialisation (for a district ( $S_j$ )) is defined as

$$S_j = \sum_{i=1}^n \left/ \frac{e_{ij}}{E_j} - \frac{E_i}{E} \right/$$

where  $e_{ij}$  = employment in  $i$ th industry in  $j$ th district  
 $E_j$  = employment in all industries in  $j$ -th district  
 $E_i$  = employment in  $i$ -th industry in the State  
 $E$  = employment in all industries in the State

When  $S_j$  is found to be 0, the district's industrial structure is as diversified as that of the State and when it is found approximately 1, the district's industrial employment is highly concentrated in only one or a few industries. The computed coefficients of specialisation for each of the districts for 1960 and 1975 are given in Table 5.

There is no reason to expect each of the districts to have factories in all of the State's industries and districts employment structure the same as of the State. In any case, a district's industrial structure cannot be any more diversified



Table 5 : Extent of Industrial diversification/specialisation  
of Districts 1960 and 1975

| District      | S <sub>j</sub> 1960 | S <sub>j</sub> 1975 | District      | S <sub>j</sub> 1960 | S <sub>j</sub> 1975 |
|---------------|---------------------|---------------------|---------------|---------------------|---------------------|
| Almora        | 0.7548              | 0.8123              | Deoria        | 0.6148              | 0.6822              |
| Pithoragarh   | -                   | 0.9730              | Faizabad      | 0.3905              | 0.4825              |
| Dehradun      | 0.2309              | 0.2205              | Ghazipur      | 0.9413              | 0.8331              |
| Garhwal       | 0.8835              | 0.5875              | Gonda         | 0.5835              | 0.6979              |
| Nainital      | 0.6308              | 0.5711              | Gorakhpur     | 0.2053              | 0.3566              |
| Tehri-garhwal | 0.9563              | 0.9543              | Jaunpur       | 0.5254              | 0.6150              |
| UttarKashi    | -                   | 0.9750              | Mirzapur      | 0.6035              | 0.4815              |
| Banda         | 0.9579              | 0.9895              | Pratapgarh    | 0.5070              | 0.9298              |
| Hamirpur      | 0.7133              | 0.9506              | Sultanpur     | 0.9291              | 0.8639              |
| Jalaun        | 0.9941              | 0.9777              | Varanasi      | 0.5620              | 0.1211              |
| Jhansi        | 0.4391              | 0.6634              | Agra          | 0.1278              | 0.3294              |
| Barabanki     | 0.9977              | 0.7184              | Aligarh       | 0.3050              | 0.1967              |
| Fatehpur      | 0.6404              | 0.8847              | Bijnor        | 0.3379              | 0.4316              |
| Hardoi        | 0.7479              | 0.7971              | Badaun        | 0.6675              | 0.6438              |
| Lucknow       | 0.5171              | 0.2227              | Bareilly      | 0.1932              | 0.3857              |
| Kanpur        | 0.3551              | 0.1015              | Bulandsahr    | 0.6840              | 0.6627              |
| Rae Bareli    | 0.9705              | 0.7552              | Etah          | 0.6791              | 0.6024              |
| Sitapur       | 0.6017              | 0.3943              | Etawah        | 0.8366              | 0.8319              |
| Unnao         | 0.8135              | 0.4382              | Farrukhabad   | 0.5845              | 0.4920              |
| Kheri         | 0.7748              | 0.7766              | Mainpuri      | 0.8243              | 0.7629              |
| Allahabad     | 0.4914              | 0.3710              | Mathura       | 0.1416              | 0.4808              |
| Azamgarh      | 0.6563              | 0.5504              | Meerut        | 0.1285              | 0.0053              |
| Baharaich     | 0.4660              | 0.6698              | Moradabad     | 0.4719              | 0.1393              |
| Ballia        | 0.6986              | 0.9302              | Muzaffarnagar | 0.5846              | 0.4182              |
| Basti         | 0.4881              | 0.5681              | Rampur        | 0.8076              | 0.4520              |
| Pilibhit      | 0.7481              | 0.7866              | Saharanpur    | 0.2799              | 0.2874              |
|               |                     |                     | Sahjehanpur   | 0.5168              | 0.6602              |

than the State's. The reason, however, as to why a diversified structure of a district is considered encouraging lies in the fact that the industries have direct as well as indirect linkages with each other, and, therefore, existence of a larger number of directly or indirectly interconnected industries is considered to provide a better potential for overall industrial growth of the district, than a narrow base consisting of one or a few industries. Empirically also it has been found that districts with a diversified industrial structure are also the ones which have the highest level of industrial activity. In fact, this relationship is found to hold consistently across the districts in Uttar Pradesh as is evident from a highly significant coefficient of correlation (-0.6694) between the coefficient of specialisation and number of factory workers in each district.

Most of the districts of the State, however, show a highly concentrated rather than diversified pattern of factory employment among industries. All the Hill districts (except Dehradun), all the districts in Bundelkhand, most of the districts in Central Uttar Pradesh (except Lucknow, Kanpur Unnao and Sitapur), all Eastern districts (except Allahabad, Gorakhpur and Varanasi) have coefficients of specialisation higher than 0.5, eleven of 18 Western Uttar Pradesh districts however, show a more diversified pattern with  $S_j < 0.5$ . On the whole there seems to have occurred a decline

in disproportionate specialisation over the period 1960-75 in most of the districts, as shown by generally a lower value of  $S_j$  in 1975 as compared to 1960. Bundelkhand districts, however, have revealed a reverse trend. So have a number of districts in Eastern region, viz., Baharaich, Ballia, Basti, Deoria, Faizabad, Gonda, Gorakhpur, Jaunpur and Pratapgarh. The districts which have achieved a substantial degree of diversification over the period are : Lucknow, Kanpur, Unnao, Varanasi, Meerut and Moradabad. Agra, Bareilly and Mathura, on the other hand, seem to have developed a more concentrated structure of factory employment over the period.

While districts with less diversified structure have only a few industries which could be considered their industrial base, even the districts with relatively diversified structure cannot claim to have all the industries in which factories are located in their jurisdiction as their industrial base. In a general sense the industrial base of a region is defined in terms of the industries in which a district has relatively higher level of activity, let us say, more than proportionate share of employment. We would try to examine this aspect with the help of location quotients. Location quotient for an industry in a district is defined as

$$l_{ij} = \frac{e_{ij}}{E_j} \bigg/ \frac{E_i}{E}$$



the various terms representing the same variables as in the case of coefficient of specialisation. Industries with  $e_{ij} > 1$  in any district are supposed to constitute the industrial base of that district. Industries which constitute industrial base of the various districts in the State on this basis are listed below (figures in brackets are value of  $e_{ij}$ ).

Table 6 : Industrial Base of Districts in Uttar Pradesh

| <u>Districts</u> | <u>Industries with <math>e_{ij} &gt; 1</math></u>  |
|------------------|--|
| Almora           | Miscellaneous Food Preparations (7.8), Wood and Cork (4.07), Miscellaneous chemical products (47.7).   |
| Pithoragarh      | None   |
| Dehradun         | Miscellaneous Food Preparations (4.50), manufacture of wood and cork (3.22), printing, book binding etc. (4.02), basic chemical products (3.51), electrical machinery (3.48); repair of motor vehicles and cycles (1.96), scientific instruments (7.19), jewellery and related articles (2.30).        |
| Garhwal          | Grain mill products (13.21), miscellaneous food preparations (2.199), boots and shoes (17.43); rubber and rubber products (15.37), musical instruments (30.62)   |
| Nainital         | Dairy products (52.00), canning and preservation of fruits and vegetables (9.75), grain mill products (2.73), sugar (2.19), miscellaneous food preparations (6.97), wearing apparels (6.12), wood and cork (3.45), miscellaneous chemical products (6.54), repair of motor vehicles and cycles (3.70). |
| Tehri-Garhwal    | Printing, book binding (2.188).  |

|              |  |
|--------------|--|
| Uttar Kashi  | Electrical machinery (40.00).  |
| Banda        | Grain mill products (9.52).  |
| Hamirpur     | Repair of motor vehicles and cycles (20.24).   |
| Jalaun       | Pulp paper and paper board (74.22), rubber and rubber products (15.33).  |
| Jhansi       | Miscellaneous chemical products (1.24), structural clay products (30.50), miscellaneous non-metallic mineral products (5.78), railroad equipment (manufacturing and repair) (5.78), repair of motor vehicles and cycles (9.42).  |
| Fatehpur     | Grain mill products (41.03), miscellaneous food products (2.66), vegetable and animal oil (10.60), iron and steel (10.23).   |
| Hardoi       | Sgar (4.43).   |
| Lucknow      | Grain mill products (2.00), distilling, rectifying and blending of spirits (5.12), wine (1.62), cordage, rope and twine (1.85), wearing apparel (1.00), printing, book-binding etc. (4.8), leather and tanneries, chemical products (1.65), other non-metallic mineral products (3.12), metal products (1.33), manufacture and repair of railroad equipment (4.72), motor vehicle (5.72), repair of motor vehicles and cycles (1.58), scientific instruments (2.29). |
| Kanpur       | Grain mill products (1.27), bakery products (2.58), soft drinks and carbonated water (1.25), tobacco products (4.03), spinning, weaving and finishing of textiles (119.70), knitting mills (1.67), cordage, rope and twine (1.20), weaving apparel (2.75), tanneries and leather finishing (4.88), rubber products (2.24), chemicals (1.46), motor vehicles (2.81), bicycles (1.36), scientific instruments (1.05), photographic and optical goods (1.00).           |
| Rae Bareilly | Spinning, weaving, and finishing of textiles (2.57), cordage, rope and twine (37.19), wood and cork products (12.40), non-metallic mineral products (5.87), metal products (1.33), electrical machinery (10.96).   |
| Barabani     | Sugar (3.19), basic chemicals (12.59), miscellaneous chemical products (1.66), non-metallic products (6.36)  |

|           |  |
|-----------|--|
| Sitapur   | Grain mill products (1.47), bakery products (2.79), miscellaneous food products (6.25), cordage, rope and twine (2.27), wood and cork products (53.30).  |
| Unnao     | Distilling, rectifying and blending of spirits (12.98), tobacco manufacture (3.01), manufacture of boots and shoes (29.12), furniture and fixtures (13.17), pulp paper and paper board (1.54), tanneries and leather finishing (12.42), rubber products (1.36), basic chemicals (12.27), vegetables and animal oil (12.00), chemical products (1.48), non-metallic mineral products (3.16), iron and steel (3.61), musical instruments (2.92).             |
| Kheri     | Sugar, sugar confectionary (349.00).   |
| Allahabad | Canning and preservation of fruits and vegetables (13.90), bakery products (4.21), spinning weaving and finishing of textiles (1.16), furniture and fixtures (1.73), pulp paper and paper board (1.46), printing, book-binding etc. (3.87), rubber products (1.22), chemical products (2.31), non-metallic mineral products (2.52), machinery (1.18), electrical machinery (10.99), scientific instruments (2.09), jewellery and related articles (10.00). |
| Azamgarh  | Spinning, weaving and finishing of textiles (4.09), repair of motor vehicles and cycles (1.32).  |
| Bahraich  | Grain mill products (18.76), sugar (2.03), miscellaneous food products (2.94), cement (17.82), repair of motor vehicles and cycles (3.51).   |
| Ballia    | Miscellaneous food products (17.05), repair of motor vehicles and cycles (13.20).  |
| Basti     | Canning and preservation of fruits and vegetables (15.50), bakery products (43.67), sugar (3.91).  |
| Deoria    | Sugar (4.78), distilling, rectifying and blending of spirits (3.53).   |

|            |  |
|------------|--|
| Faizabad   | Sugar (1.64), miscellaneous food products (1.31), spinning, weaving and finishing of textiles (1.76), wood and cork (4.28), pulp paper and paper board (6.47).   |
| Ghazipur   | Pottery, china and earthenware (184.00).   |
| Gonda      | Grain mill products (2.00), sugar (3.70), distilling rectifying and blending of spirits (13.21), wines (15.23), wood and cork (7.75).  |
| Gorakhpur  | Sugar (1.85), printing, book-binding etc. (21.15), basic chemicals (including fertilizers (10.95), iron and steel (1.00).  |
| Jaunpur    | Bakery products (4.71), sugar (2.38), miscellaneous food products (4.68), basic chemicals (1.47), iron and steel (2.86), machinery (1.56), repair of motor vehicles and cycles (3.41).   |
| Mirzapur   | Basic chemicals (1.54), cement (29.49), non-metallic mineral products (1.41), non-ferrous metal and metal products (23.57).  |
| Pratapgarh | Miscellaneous food products (14.56), repair of motor vehicles and cycles (14.23).  |
| Sultanpur  | Wood and cork (36.68), iron and steel (1.32), metal products (3.56), repair of motor vehicles and cycles (13.36).  |
| Varanasi   | Bakery products (1.13), soft drinks and carbonated water (1.75), knitting mills (8.59), cordage, rope and twine (8.00), weaving apparel (3.88), basic chemicals (4.71), non-metallic mineral products (1.56), machinery (3.14), electrical machinery (2.41), railroad equipment (2.96), repair of motor vehicles and cycles (1.03), manufacture of bicycles (2.94), scientific instruments (7.05). |
| Agra       | Miscellaneous food products (1.71), soft drinks and carbonated water (1.25), knitting mills (4.00), miscellaneous textiles (2.00), boots and shoes (1.87), furniture and fixtures (1.87), glass and glass products (7.79).   |

|             |   |
|-------------|---|
| Aligarh     | Dairy products(4.19), grain mills products (1.11), miscellaneous food products(3.44), printing publishing and book binding (2.27), vegetable and animal oils (5.00), metal products (3.92), aircraft manufacture (27.70), musical instruments (7.04).                                       |
| Bijnor      | Sugar (4.28), wood and cork (1.53), repair of motor vehicles and cycles (1.52).   |
| Badaun      | Sugar (1.52), miscellaneous food products (6.19), pulp paper and paper board (18.35), basic metals ferrous (4.60), repair of motor vehicles and cycles (3.05).  |
| Bareilly    | Sugar (1.05), miscellaneous food products (2.82), distilling, rectifying and blending of spirits (1.28), soft drinks, and carbonated water (12.25), wood and cork (1.70), printing, book-binding etc. (3.91), machinery (1.54), railroad equipment (3.87), repair of motor vehicles (1.11). |
| Bulandsahr  | Sugar (2.67), miscellaneous food product (2.59), rubber and rubber products (2.89), chemical products (6.59), repair of motor vehicles and cycles (2.59).   |
| Etah        | Dairy products (9.54), grain mill products (1.33), sugar (3.11), miscellaneous food products (1.75), chemical products (2.63), metal products (1.30), repair of motor vehicles and cycles (1.48).   |
| Etawah      | Grain mill products (34.64), miscellaneous food products (1.61), tobacco products (16.26), chemical products (2.13), repair of motor vehicles and cycles (1.10).  |
| Farrukhabad | Sugar (2.09), miscellaneous food products (13.14), tanneries and leather finishing (2.35), basic metals (1.79), repair of motor vehicles and cycles (1.85).   |
| Mainpuri    | Grain mill products (8.97), miscellaneous food products (2.16), pulp paper and paper board (3.21), vegetable and animal oil (2.67), electrical machinery (23.30), repair of motor vehicles and cycles (1.33).   |



|                                    |   |
|------------------------------------|---|
| Mathura                            | Grain mill products (5.66), miscellaneous textiles (138.50), pulp paper and paper board (2.12), printing, book-binding etc., (1.02), basic chemicals including fertilisers (1.28), chemical products (1.67), pottery, china and earthenware (6.33), other non-metallic mineral products (33.59), basic metals (2.08), non-ferrous metals (9.85), metal products (3.42), machinery (2.42), repair of motor vehicles and cycles (1.06).   |
| Meerut<br>(including<br>Ghaziabad) | Canning and preservation of fruits and vegetables (2.05), miscellaneous food products (1.27), breweries and incidental processes (5.17), soft drinks and carbonated water (1.81), spinning, weaving and finishing of textiles (1.58), pulp paper and paper board (2.16), rubber and rubber products (4.05) chemical products (1.67), Pottery, china and earthenware (2.23), basic metals (1.67), machinery (3.42), electrical machinery (1.36), manufacture of bicycles (4.04), watches and clocks (6.71), jewellery and related articles (4.10), musical instruments (4.00). |
| Moradabad                          | Dairy products (2.05), sugar (3.35), non-ferrous metals (2.30), metal products (1.62), aircraft manufacture (13.90).  |
| Muzaffar-<br>nagar                 | Dairy products (1.44), sugar (3.94), distilling rectifying and blending of spirits (2.14), vegetable and animal oils (10.00), basic metals (1.90).  |
| Rampur                             | Sugar (3.00), cordage, rope and twine (3.85), chemical products (8.58), non-metallic mineral products (1.50).   |
| Pilibhit                           | Grain mill products (1.07), sugar (4.87).   |
| Saharanpur                         | Dairy products (10.50), sugar (1.34), wine (24.00) tobacco products (2.42), knitting mills (2.00), pulp paper and paper board (6.04), vegetable and animal oils (3.47), non-metallic mineral products (1.25), machinery (7.06), railroad equipment (2.38), Photographic and optical goods (4.00).   |
| Shahjehanpur                       | Grain mill products (1.63), sugar (4.10), miscellaneous food products (2.37) distilling, rectifying and blending of spirits (15.81).  |

The above list of industries and their location quotients for different districts needs to be read carefully. Obviously, it does not mean that industries not mentioned in the list do not exist in a district, nor does it imply that industries mentioned are the largest ones in the district. Location quotient is a highly relative measure of specialisation, and when it is more than one for an industry in a district, as is the case of the industries in each district listed above, it only implies that the industry has a higher proportion in the district's industrial employment than it has in the State's industrial employment. A large number of industries with higher than one location quotient does not necessarily imply anything desirable or undesirable for a district. In fact, districts with highly diversified structure do not show a very high value of location quotient for specific industries, even though it may contribute a significantly high proportion of the State's industrial employment in each of them.

Industries with a higher than one location quotient are, taken to constitute the industrial base of a region for the simple reason that a higher proportion of such industries within a region's industrial structure implies higher than average weightage of those industries in the district which might imply some locational advantage. Therefore, from a policy viewpoint it is considered desirable to start with an emphasis on these

industries, if the region's industrial development is to be accelerated. This approach also recognises the need for specialisation and futility of efforts at the level of micro-regions to develop a highly diversified industrial structure. It has much to commend itself at the level of district where attempt to develop all types of industries may not be meaningful and therefore a selective approach has to be adopted.

#### Locational Linkages Among Industries

The approach, however, becomes more effective if the clusters of industries constituting the industrial base for of a region do not merely reflect a coexistence of various industries based on coincidental or historical circumstances, but consist of sets of technologically interlinked industries. On the basis of the generally observed pattern of inter-industry linkages, one could broadly identify the following groups each consisting of industries with possibilities of mutual input and market linkages.

- i) Food processing industries (excluding sugar)
- ii) Sugar, gur, etc., and beverages
- iii) Textile based industries
- iv) Leather based industries
- v) Forest based industries
- vi) Chemical and chemical based industries
- vii) Non-metallic mineral products group
- viii) Metals, machinery, instruments and transport equipment.



For achieving rapid industrial development simultaneously with better interregional spread of industrial activity identification of technologically linked clustres of industries and planning to develop them areawise is one of the most suitable approaches. While certain districts and areas seem to already have an industrial base around such clustres, in a number of others the necessary links are missing. A tentative effort based on the limited data and exercise given above results in the identification of the following pattern of such clustres in various districts and regions. Among the eight districts of the Hill region, the only somewhat developed clustres are: food processing industries group in Nainital and a somewhat loosely connected group of metals and machinery products in Dehradun. While most of the districts in this region have demonstrated some potential for development for food processing forest based products and chemical products groups, there do not seem to have developed a complex of mutually linked industrial units in these potential groups of industries. Bundelkhand's industrial activity in the factory sector does not suggest the realisation of any of the clustres, although a few industries in which the region seems to have relative specialisation, such as in the chemical group and machinery group in Jhansi, food group in Banda and rubber and plastics in Jalaun have potential of backward and forward linkages to develop other related industries.

In the central region, Kanpur obviously has a strong textile based clustre, another based on metal and machinery group and also one based on leather. A plastic-cum-chemical clustre is also visible, even though in an embryonic form. Unnao shows a very well developed clustre of chemical based and another of forest based industries. Lucknow seems to have developed a base on transport equipment group of industries. Sitapur shows potential of developing a complex around food products group; and so does Kheri, to some extent. Rae Bareli's industrial base suggests two clustres, textile based and metal based, both being in embryonic form at the moment. The same can be said about a food products based clustre in Fatepur.

Eastern Uttar Pradesh districts seem to have potential for developing quite a few inter-related groups of industries. But only some of them are on the way of growing: food products group in Allahabad, Basti, Gonda, and Jaunpur; textile based clustre in Varanasi; forest products based group in Allahabad and metal based clustres in Allahabad and Varanasi. The following clustres exist in an embryonic form: food products group in Bharaich and Faizabad; textile based group in Allahabad and Azamgarh; forest based group in Faizabad, Gonda and Sultanpur; chemical group in Gorakhpur, Jaunpur, Mirzapur and Varanasi, and metal products group in Sultanpur and Jaunpur. In Western Uttar Pradesh the most well developed clustering is around metal

products and machinery in Meerut, Mathura, Sharanpur and Bareilly; food products group in most of the districts; textile based group in Agra and Sharanpur; forest based clustre of industries in Bareilly and Saharanpur.

#### Intial and Incremental Industrial Activity

Turning to the analysis of the pattern of location of the incremental industrial activity during the years 1960-75 we start with the simple proposition that the new industrial activity tends to get located where industries already exist. The proposition can may be tested both at all industry and individual industry level. If validated, this hypothesis leads to somewhat discouraging implications regarding diversification and calls for a planned big push as the only solution to the development of industrially backward areas; incentives and subsidies, and success in locating one or few units would hardly produce any effect. We have attempted to verify this hypothesis by correlating the factory employment in 1960 with the increase that took place during 1960-75, in each of the districts. The analysis is attempted for total industrial employment and also for each of such 13 important industries which are spread over at least 10 districts. The coefficients of correlation between the base year and incremental factory employment are presented in Table 7.

Table 7 : Relation Between Base and Incremental Industrial Employment

| Industry Group  | r between E <sub>1960</sub> and E <sub>1960-75</sub> | N  |
|---|--|----|
| All industries  | 0.35*  | 51 |
| 206 Manufacture of bakery product                       | 0.39   | 13 |
| 207 Sugar factories and refineries                      | 0.21   | 34 |
| 209 Manufacture of miscellaneous food preparations      | 0.38*  | 39 |
| 231 Spinning, weaving and finishing of textile          | -0.79**  | 25 |
| 233 Cordage, rope and twine industries                  | -0.18  | 15 |
| 300 Rubber and rubber products                          | -0.09  | 17 |
| 311 Basic chemicals including fertiliser                | -0.04  | 23 |
| 319 Manufacture of chemical products                    | -0.14  | 29 |
| 341 Ferrous - manufacture of iron and steel             | 0.17   | 27 |
| 342 Non-ferrous - melting and refining of metals        | 0.06   | 18 |
| 350 Manufacture of metal products                       | 0.26   | 25 |
| 370 Manufacture of electrical machinery, appliance etc. | 0.09   | 14 |
| 384 Repair of motor vehicles and cycles                 | -0.72**  | 41 |

\* significant at 5 per cent level

\*\* significant at 1 per cent level

Others not significant

The distribution of total increase in factory employment across districts, is related, though weakly, with the distribution that existed in 1960, which implies that to a certain extent incremental industrial activity has tended to go to districts with already relatively high industrial employment. But the relationship does not hold in case of individual industries : in 12 out of 13 industries considered here the additional employment did not get distributed in the pattern obtaining in 1960, and in the case of textiles and repair of motor vehicles and cycles, it is highly significantly different. The only industry where the distribution of incremental employment had a significantly similar pattern with that of 1960, is the manufacture of miscellaneous food products.

Overall, therefore, the hypothesis that new factories and employment in an industry tend to go to districts where units in that industry already exist does not hold in case of most of the industries, which augurs well for the possibility of diversification of manufacturing activities and industrial development of backward areas. We, however, find that the hypothesis holds though weakly when all industries are taken together. Let us therefore now examine a related hypothesis : industrial units in an industry tend to go to locations where related industries--with linkage potential--already exist. We have attempted to examine this relationship in the case of four sets of inter-related industries: food products group, textiles, chemicals,



and metal based group. The only relationships that turned out significant are the following:

Table 8 : Locational Interrelationships Among Industries

---

|  |     |            |
|--|-----|------------|
| E 1960 in 209 with $\Delta$ E 1960-75 in | 206 | $r = 0.75$ |
| 231                                      | 239 | $r = 0.99$ |
| 319                                      | 300 | $r = 0.63$ |
| 342                                      | 370 | $r = 0.74$ |
| 384                                      | 341 | $r = 0.96$ |
| 384                                      | 350 | $r = 0.98$ |
| 384                                      | 370 | $r = 0.44$ |

---

The results of the exercise read with those reported in Table 7 suggest that expansion of an industry is more often related with the base of the related industries, than its own importance, in a region. But this relationship is also found operative only in a few cases. To a certain extent it may be a reflection of the very nature of industrial structure in the State : dominance of industries of autonomous type without much forward and backward linkages. But still, some of the relationships seem highly meaningful. For example, location of new activity in the manufacture of miscellaneous textile products is highly positively associated with the level of activity in the spinning, weaving and finishing of textiles in the base year.

Similarly, in the manufacture of electrical machinery, apparatus, appliances etc., the new activity has got located in different districts in line with the base of melting and refining of the non-ferrous metals. The base of repair activities is found very closely related with the new activity in basic metals and metal products. In the food products group, bakery products and miscellaneous food preparations have gone together; while rubber products and chemical products have formed another pair of industries with closely associated locations.

This aspect of locational structure, however, needs to be investigated in greater detail with a view to identifying a larger number of operational and potential associations and clustres, and the nature of their associations-forward or backward linkages or reliance on some common inputs available in a region. Such identification of clustres and catalytic industries may be of great help in locational planning of industrial activity.

#### Factors in Location : Some Macro-Variables

A detailed analysis of factors in location of specific industries in terms of the variables affecting costs, prices and other relevant inputs for location decisions, as well as of the locational linkages among industries is planned to be carried out on the basis of the primary data currently being collected from a sample of factories in different industries and districts. A preliminary analysis based on some overall characteristics of different districts is undertaken here as

an attempt to explain the spatial distribution of incremental industrial activity. The factors chosen are meant to represent the demand and raw material situation, infrastructure, and efforts made by public institutions to develop industries in different districts. Value of agricultural production per person is assumed to reflect the local demand for industrial products as well as the rawmaterial base. Road mileage per 1000 square kilometers of area, population per bank office, and electricity consumption are taken to represent the general level of infrastructure development. Loans and investments made by promotional and financial institutions such as U.P. State Industrial Development Corporation (UPSIDC), U.P. Financial Corporation (UPFC), and Pradeshiya Industrial and Investment Corporation of Uttar Pradesh (PICUP) are taken as the indicators of the official efforts to develop industries in different districts. Multiple regression and partial correlation analysis has been carried out with the above as the independent variables and number of factories and employment added in all industries together, and additional factory employment in each of the 12 selected industries in various districts as the dependent variables. The results of the analysis are reported in Table 9.

The results of the regression analysis show an overall high explanatory power of the model in most of the cases, and most of the coefficients are also found to be significant. It

is found that the inter-district variations in the number of new factories established and employment added in all industries during 1960-75, are quite well explained by the macro-characteristics of the districts selected for analysis. A unit (Rs.100) variation in value of per capita agricultural production is found to be associated with 20 units variation in factories and 600 unit variation in employment. A different of one kilometer of road per 1000 of population has been accompanied by a variation of 0.45 of factory and 28 persons in employment. The bank office variable is negatively specified in terms of population ('000) per bank branch, and therefore its coefficient has a negative sign; its values are significantly associated with incremental industrial activity, a reduction in per bank office population by 1000 is associated with the location of half a new factory and increase in factory employment by 78 persons. A higher investment by public institutions of Rs.1 lakh in one district than in another, brings about a difference of 0.17 of a factory and 6 workers. Similarly if electricity consumption changes by 1 KW per person from one district to another, it is associated with a difference of 0.11 of a factory<sup>and</sup> employment to 12 persons.

The value of agricultural production per person is found to be associated with the addition in factory employment in the case of most of the selected industries also. In a few,



TABLE - 9

## RESULTS OF REFRESSION ANALYSIS

| Y   | Constant  | Coefficients of independent variables |                     |                    |                    |                    | R <sup>2</sup> |
|---|-----------|---------------------------------------|---------------------|--------------------|--------------------|--------------------|----------------|
|   |           | X <sub>1</sub>                        | X <sub>2</sub>      | X <sub>3</sub>     | X <sub>4</sub>     | X <sub>5</sub>     |                |
| 1 Factories added during 1960-75: All Industries ( $\Delta$ F 1960-75)          | - 75.37   | + 20.37*<br>( 0.598)                  | + 0.45*<br>(0.014)  | - 0.54*<br>(0.041) | + 0.17*<br>(0.004) | + 0.11*<br>(0.019) | .9814          |
| 2 Factory Employment added during 1960-75: All Industries ( $\Delta$ E 1960-75) | - 596.86  | + 600.77*<br>(104.60)                 | + 28.10*<br>(2.51)  | - 77.59*<br>(7.15) | + 6.30*<br>(0.663) | + 11.94*<br>(3.40) | .8768          |
| 3 E 1960-75 Industry : 207 Sugar  | - 7529.06 | +1538.61*<br>( 10.47)                 | + 35.28*<br>(0.244) | - 6.09*<br>(0.74)  | - 3.45*<br>(0.057) | + 21.10*<br>(0.47) | .9902          |
| 4 $\Delta$ E 1960-75 Industry : 209 Misc. Food Products                         | - 66.20   | + 77.69*<br>( 0.30)                   | + 0.32<br>(0.19)    | - 2.40*<br>(0.58)  | - 0.12<br>(0.044)  | - 0.57<br>(0.226)  | .7611          |
| 5 $\Delta$ E 1960-75 Industry : 231 Textile Weaving Spinning etc.               | -10142.40 | +1177.45*<br>(109.11)                 | + 38.87*<br>(2.26)  | + 59.48*<br>(7.26) | + 1.12<br>(0.45)   | + 2.17<br>(2.33)   | .7885          |
| 6 $\Delta$ E 1960-75 Industry : 233 Cardage, rope and Twine Industries          | 1056.40   | - 113.91*<br>( 2.97)                  | - 1.86*<br>(0.058)  | - 13.91*<br>(.257) | - 0.03*<br>(0.009) | - 0.06<br>(0.52)   | .9732          |
| 7 $\Delta$ E 1960--75 Industry : 300 Rubber and rubber Products                 | 256.62    | 136.03*<br>( 0.82)                    | - 4.39<br>(0.018)   | - 9.81<br>(0.756)  | + 1.05<br>(0.003)  | + 0.05<br>(0.018)  | .9728          |
| 8 $\Delta$ E 1960-75 Industry : 311 Basic Chemicals incl. fertilizers           | 1263.96   | - 219.08*<br>( 27.39)                 | - 3.59*<br>(0.528)  | - 3.43<br>(2.15)   | + 0.13<br>(0.105)  | + 0.57<br>(0.54)   | .6817          |



TABLE - 9 (contd.)

| Y   | Constant  | Coefficients of independent variables |                     |                     |                     |                    | R <sup>2</sup> |
|---|-----------|---------------------------------------|---------------------|---------------------|---------------------|--------------------|----------------|
|   |           | X <sub>1</sub>                        | X <sub>2</sub>      | X <sub>3</sub>      | X <sub>4</sub>      | X <sub>5</sub>     |                |
| 9 $\Delta$ E 1960-75<br>Industry : 319<br>Misc. Chemical<br>Products                                | - 71.26   | + 55.61*<br>( 4.73)                   | + 0.378*<br>(0.106) | - 2.301*<br>(0.371) | + 0.416*<br>(0.023) | - 0.186<br>(0.118) | .9383          |
| 10 $\Delta$ E 1960-75<br>Industry : 341<br>Iron and Steel   | - 2308.83 | +381.55*<br>( 9.68)                   | 5.30*<br>(0.204)    | +14.41*<br>(0.759)  | + 2.32*<br>(0.436)  | + 0.001<br>(0.242) | .9894          |
| 11 $\Delta$ E 1960-75<br>Industry : 342<br>Non-ferrous metal<br>melting & refining                  | - 2302.42 | +386.72*<br>( 7.03)                   | + 3.85*<br>(0.138)  | +13.42+<br>(0.492)  | - 0.32*<br>(0.024)  | +13.00<br>(0.136)  | .9968          |
| 12 $\Delta$ E 1960-75<br>Industry : 350<br>Metal products   | - 1402.53 | +156.02*<br>( 6.99)                   | + 2.99*<br>(0.16)   | + 8.22*<br>(0.583)  | + 2.30*<br>(0.030)  | + 0.86*<br>(0.155) | .9948          |
| 13 $\Delta$ E 1960-75<br>Industry : 370<br>Electrical Machinery<br>apparatus, applia-<br>nces, etc. | - 435.26  | - 45.36<br>(34.68)                    | + 1.18<br>(0.709)   | +11.53*<br>(2.95)   | + 1.49*<br>(0.130)  | + 0.12<br>(0.67)   | .9964          |
| 14 $\Delta$ E 1960-75<br>Industry : 384<br>Repair of motor<br>vehicles & motor<br>cycles            | 4131.85   | -531.15*<br>(23.92)                   | 8.13*<br>(0.533)    | -29.13*<br>(1.623)  | - 2.23*<br>(0.133)  | - 2.59*<br>(0.68)  | .9103          |

X<sub>1</sub> : Value of agricultural production per person 1970-71 (Rs.900)X<sub>2</sub> : Road mileage per 1000 square KM area 1970-71 (K.M.)X<sub>3</sub> : Population per commercial bank office 1977-78 (1000)X<sub>4</sub> : Loans and investments by financial institutions (UPSIDC, UPFC and PICUP) upto 1975 (Rs.lakhs)X<sub>5</sub> : Electricity consumption per head 1970-71 (in KW.)

TABLE - 10

## PARTIAL CORRELATION COEFFICIENTS

| Y  | $YX_1 \cdot X_2$<br>$X_3, X_4, X_5$ | $YX_2 \cdot X_1$<br>$X_3, X_4, X_5$ | $YX_3 \cdot X_1$<br>$X_2, X_4, X_5$ | $YX_4 \cdot X_1$<br>$X_2, X_3, X_5$ | $YX_5 \cdot X_1$<br>$X_2, X_3, X_4$ |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1 Factories added during 1960-75: All Industries ( $\Delta F$ 1960-75)           | + .2572                             | + .2829                             | - .1610                             | + .8096*                            | + .1621                             |
| 2 Factory Employment added during 1960-75 : All Industries ( $\Delta E$ 1960-75) | + .0721                             | + .1687                             | - .2092                             | + .4361*                            | + .1627                             |
| 3 $\Delta E$ 1960-75 Industry : 207 Sugar  | + .7040                             | + .7793                             | - .0820                             | - .8600*                            | + .6212                             |
| 4 $\Delta E$ 1960-75 Industry : 209 Misc. Food Products                          | + .1518                             | + .0271                             | - .1107                             | - .1633                             | - .1441                             |
| 5 $\Delta E$ 1960-75 Industry : 231 Textile Weaving Spinning etc.                | + .2317                             | + .3195                             | + .2741                             | + .1861                             | + .0611                             |
| 6 $\Delta E$ 1960-75 Industry : 233 Cardage, rope and Twine industries           | - .5217                             | - .2788                             | - .5508                             | - .1447                             | - .1884                             |
| 7 $\Delta E$ 1960-75 Industry : 300 Rubber and Rubber Products                   | + .5485                             | - .6984                             | - .5377                             | + .9814*                            | + .0488                             |
| 8 $\Delta E$ 1960-75 Industry : 311 Basic Chemicals incl. Fertilizers            | - .2227                             | - .1645                             | - .0614                             | + .1193                             | .0858                               |
| 9 $\Delta E$ 1960-75 Industry : 319 Misc. Chemical Products                      | + .1978                             | + .0632                             | - .1751                             | + .7226*                            | - .0819                             |
| 10 $\Delta E$ 1960-75 Industry : 341 Iron and Steel                              | + .3994                             | + .2498                             | + .2860                             | + .8832*                            | + .0368                             |

TABLE - 10 (contd.)

| Y   | $YX_1 \cdot X_2$<br>$X_3, X_4, X_5$ | $YX_2 \cdot X_1$<br>$X_3, X_4, X_5$ | $YX_3 \cdot X_1$<br>$X_2, X_4, X_5$ | $YX_4 \cdot X_1$<br>$X_2, X_3, X_5$ | $YX_5 \cdot X_1$<br>$X_2, X_3, X_4$ |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 11 $\Delta E$ 1960-75<br>Industry : 342<br>Non-ferrous metal<br>melting & refining                | + .5281                             | + .2419                             | + .3926                             | - .3799                             | + .9402*                            |
| 12 $\Delta E$ 1960-75<br>Industry : 350<br>Metal products   | + .2106                             | + .1615                             | + .1677                             | + .9205*                            | + .1471                             |
| 13 $\Delta E$ 1960-75<br>Industry : 370<br>Electrical Machinery<br>Apparatus,<br>Appliances, etc. | - .0326                             | + .0334                             | + .1233                             | + .6509*                            | + .0120                             |
| 14 $\Delta E$ 1960-75<br>Industry : 384<br>Repair of Motor<br>Vehicles and<br>Motor Cycles        | - .3015                             | - .2154                             | - .3579                             | - .6556*                            | - .1718                             |

$X_1$  : Value of agricultural production per person 1970-71 (Rs.900)

$X_2$  : Road mileage per 1000 square MN area 1970-71 (K.M.)

$X_3$  : Population per commercial bank office 1977-78 (1000)

$X_4$  : Loans and investments by financial institutions  
(UPSIDC, UPFC and PICUP) upto 1975 (Rs. lakhs)

$X_5$  : Electricity consumption per head 1970-71 (in Kw.)

(cordage, rope and twine industries; basic chemicals and repair of motor vehicles), however, the coefficients have a significant and negative value. No logical explanation could be given for this : the location of new factories and employment in these industries may well not be related with the level of agricultural development, but there is no reason to believe that it has an inverse casual relation. Similar is the case of road mileage in the equation for cordage, rope and twine, basic chemicals; of banking facilities in the equations for textile weaving, spinning etc., iron and steel, non-ferrous metals, metal products and electrical machinery; of institutional finance in case of sugar, cordage, rope and twine, miscellaneous chemical products, and repair of motor vehicles. Particularly in case of cordage, rope and twine industries, and repair of motor vehicles and motor cycles the results are contrary to expectations, and can only be explained in terms of the inadequacy of the model. These cases may be investigated at a later stage on the basis of more specific variables.

Overall, the variations in agricultural development seem to explain a large part of the inter-district variations in the location of incremental industrial activity. It must, however, be kept in mind that the large values of the coefficients of this variable reflect the unit used in specification (Rs'00) and its relatively low variation as compared to the dependent variable. Transport facilities, represented by road mileage is



again found to have a strong effect; it is found to be particularly high in case of sugar, and textile industries and quite low in miscellaneous food products and miscellaneous chemical products. Banking facilities are found to have a substantial effect in overall industrial activity, but their effect is found particularly notable in sugar, cordage, rope and twine, rubber and rubber products, and repair of motor vehicles and motor cycles. Institutional financing seems to have contributed particularly significantly in the case of basic metals and engineering industries.

It is interesting to note, however, that while the contribution of each of these variables is quite significant in combination with each other, it pales into virtual insignificance once the variables are considered singly. Partial correlation coefficients, measuring the contribution of a variable keeping the others constant, turn out to be insignificant in most of the cases. The only variable which gives significant partial correlation coefficient, at least in some cases, is the institutional finance. In case of overall distribution both of added factories and employment the loans and investments made by State level institutions explain a significant extent of inter-district variations, even when the influence of other variables is ignored. Similar tendency is found to prevail in case of some individual industry groups: rubber and rubber products, basic metals (iron and steel), metal products, chemical products and electrical machinery.



The broad conclusion that emerge from the above analysis is that the macro-variables relating to levels of agricultural development, infrastructure and special efforts by public institutions, by and large, explain the inter-district variations in location of economic activity significantly. It, however, looks that their influence is much better felt if applied in combination. Special promotional and financial efforts by public institutions, however, seem to make their results felt to a certain extent, irrespective of other macro-characteristics of the districts, particularly in the case of modern foot-loose industry, not based on specific local raw material.

#### Summary and Conclusions

The foregoing description and analysis of the spatial structure of factory industries can now be recapitulated in terms of some major conclusions and implications for analysis and policy.

1. The factory sector of manufacturing activities in Uttar Pradesh has grown at a rate of 5.5 per cent per annum in terms of number of factories and 3.5 per cent per annum in terms of factory employment during 1960-75. The modern sector of industries, such as chemicals and engineering has experienced relatively faster growth than the traditional industries such as Sugar and Textiles. The new factories have been of relatively

smaller size on an average than the old ones, thus making the employment average per factory around 90 in 1975 as against over 108 in 1960.

2. In terms of products groups, significant changes have taken place in the State's industrial structure during this period. The five biggest industries (textiles, sugar, glass, railroad equipment and machinery) contributed 76 per cent of factory employment in 1960, their contribution was only 52 per cent in 1975. The share of industries based on raw materials from agriculture, animal husbandry and forestry declined from 31 to 29 per cent, that of consumer goods industries based on non-local raw materials declined from 37 to 31 per cent and of the capital and intermediate products industries increased from 32 to 40 per cent. On the whole, raw material location specific industries declined in relative importance while footloose industries increased their share substantially. This change made the State's industrial structure locationally more flexible and spatially more diversifiable.

3. In fact, however, the spatial structure of industries remained as concentrated in 1975 as it was in 1960, the most significant change noticed is that, Kanpur contributed only 17 per cent of factory employment in 1975 as against 26 per cent in 1960, while Meerut (including Ghaziabad) has now 14 per cent of factory employment as against 11 per cent in 1960.

The five most industrialised districts, Kanpur, Meerut, Lucknow, Agra and Gorakhpur together claimed 57 per cent in 1960 and 55 in 1975. The 10 industrially least developed districts of the State claimed 1.10 per cent of factory employment in 1960, their share is reduced to 0.56 per cent in 1975. The five regions Eastern, Central, Western, Bundelkhand and Hills had 20, 37, 38, 2 and 3 per cent share in 1960; and 18, 26, 49, 3 and 3 per cent in 1975 respectively. Thus the Central region lost ground heavily while the Western gained.

4. The notified backward districts (39) also experienced a decline in their share of factory employment from 15 to 13 per cent. The new factories going to the backward districts, also went mainly to such of them which are in the vicinity of industrially better developed districts. Assuming that incentives and subsidies are some attraction to locate factories in backward districts it only looks logical that the entrepreneurs would avail of them nearer a developed district, rather than in a backward district in a backward region, as the extent of incentives and subsidies would be the same. Given the same incentives and subsidies, Unnao, for example, provides a much better location than, say, Ballia, and Uttarkashi. If the objective of development of backward districts is to be taken seriously, the incentives have to be graded progressively in favour of relatively more backward districts.

5. Industrial structure of most of the districts is of a highly 'specialised' nature, only a few industries account for most of industrial activity. Industrial backwardness and lack of diversified structure are closely associated. Only a few districts, Meerut, Kanpur, Agra, Varanasi, Moradabad, Aligarh and Lucknow have almost as diversified structure as of the State as a whole, and all these districts are industrially better developed. That, however, does not mean that districts cannot develop on the basis of industrial specialisation. An appropriate strategy for industrial development of various, particularly backward districts, may consist of specialisation on the basis of clustres of interrelated industries, not just one or two industries selected randomly, rather than trying to develop all industries in all districts. A study of industry-wise specialisation pattern of districts reveals that such clustres either already exist or there is the potential for developing them; and, with proper planning some clustres or the other can be developed in each of the districts. Such existing and potential clustres have been tentatively identified in our analysis.

6. Has the new industrial activity gone to the districts where industries already existed? The answer is positive, to some extent, if we take the total industrial activity. But once we take the individual industries we find that, the new factories and additional employment in an industry has not

necessarily got located in districts where the activity already existed; it has at least not gone to various districts in the same proportion. This finding has significance from the viewpoint of the diversifiability of industries; industries can be taken to places where they do not exist at present. What is more significantly discernible, in quite a few cases, is the fact that additional activity in an industry has gone to districts more or less in proportion of the existence of activity in another but interrelated industry. That again goes to support the idea of clustering in preference over localisation of single industry or asking for all industries in a district.

7. An exercise to explain inter-district variations in the location of new industrial activity added during 1960-75 in terms of some macro-variables pertaining to level of agricultural development, infrastructure and promotional efforts by the public institutions, suggests that they can produce significant results in combination, but not in isolation of each other. Infrastructure items such as transport network, power consumption and banking facilities also are able to attract new factories in a district only when the district is favourably placed in terms of level of agricultural development and special efforts made by State agencies in this regard. The promotional



efforts made by the State institutions (UPSIDC, UPFC and PICUP), measured in terms of the financial assistance rendered by them to industries in each of the district, however, seem to produce results even independently of the other factors. The finding implies that these institutions have been, and can be effective in getting industrial activities located even in districts which are not very favourably placed in terms of general level of economic and infrastructure development.

The above findings suggest that while, the significance of raw material availability and proximity to the market as factors in location cannot be denied their adequacy to explain the location pattern in entirety is doubtful. There are at least two propositions which suggest themselves as promising hypothesis for explaining the locational pattern of new industrial activity. One, as the industrial economy of a region grows the significance of basic raw material as a locational factor declines due to the emergence and increasing proportion of industries which are not based on the local weight losing raw material; and the proximity to the final consumption head also becomes less significant to the extent with the emergence of technology involving greater degree of input-output relationship among industries, the industrial production sector itself provides market for an increasing part of its product. Availability universal intermediaries and infrastructure, and agglomeration emerge as more important factor in location.

Second, there appears to be a high degree of indivisibility of the influences produced by different factors in location, they produce results in unison, but in isolation most of them lose significance. A more detailed analysis of these propositions will be attempted as the required information from the factories, being collected currently becomes available.

The findings obviously have theoretical, methodological as well as policy implications. In the sphere of policy, the findings imply that industrial planning, rather than piecemeal incentives and doses of infrastructure, would alone contribute significantly to the objectives of industrial diversification. While the special efforts made by public institutions in terms of financial and other assistance have potential to influence location, their impact could be substantial only if these efforts are made as a part of the industrial development plans of different regions and districts.

Appendix Table : 1Factories and Factory Employment in U.P. : 1960 & 1975

(by Industry Groups)

| Sl. Industry<br>No. Groups | 1960           |                  | 1975           |                  | Addition (1960 - 75) |                  |
|----------------------------|----------------|------------------|----------------|------------------|----------------------|------------------|
|                            | Units          | Employment       | Units          | Employment       | Units                | Employment       |
| 1 010                      | 16<br>(0.65)   | 498<br>(0.18)    | 1<br>(0.02)    | 18<br>(0.00)     | - 15<br>(-0.74)      | - 480<br>(-0.38) |
| 2 202                      | 7<br>(0.28)    | 383<br>(0.14)    | 14<br>(0.31)   | 4100<br>(1.04)   | 7<br>(0.34)          | 3717<br>(2.98)   |
| 3 203                      | 14<br>(0.57)   | 621<br>(0.23)    | 12<br>(0.27)   | 778<br>(0.20)    | - 2<br>(-0.10)       | 157<br>(0.13)    |
| 4 205                      | 262<br>(10.60) | 4929<br>(1.83)   | 233<br>(5.18)  | 4141<br>(1.05)   | - 29<br>(-1.43)      | - 788<br>(-0.63) |
| 5 206                      | 7<br>(0.28)    | 276<br>(0.10)    | 34<br>(0.75)   | 963<br>(0.24)    | 27<br>(1.33)         | 687<br>(0.55)    |
| 6 207                      | 304<br>(12.30) | 60561<br>(22.52) | 766<br>(17.02) | 79821<br>(20.29) | 462<br>(22.80)       | 19260<br>(15.47) |
| 7 208                      | 2<br>(0.08)    | 86<br>(0.03)     | 1<br>(0.02)    | 41<br>(0.01)     | - 1<br>(-0.04)       | - 45<br>(-0.04)  |
| 8 209                      | 138<br>(5.58)  | 7931<br>(2.95)   | 197<br>(4.38)  | 8029<br>(2.04)   | 59<br>(2.91)         | 98<br>(0.08)     |
| 9 211                      | 15<br>(0.61)   | 1074<br>(0.40)   | 9<br>(0.20)    | 1683<br>(0.43)   | - 6<br>(-0.30)       | 609<br>(0.49)    |
| 10 212                     | 1<br>(0.04)    | 103<br>(0.04)    | 1<br>(0.02)    | 59<br>(0.01)     | -<br>(-)             | - 44<br>(-0.03)  |
| 11 213                     | -<br>(-)       | -<br>(-)         | 7<br>(0.15)    | 1563<br>(0.40)   | 7<br>(0.34)          | 1563<br>(1.25)   |
| 12 214                     | 1<br>(0.04)    | 34<br>(0.01)     | 7<br>(0.15)    | 617<br>(0.16)    | 6<br>(0.30)          | 583<br>(0.47)    |
| 13 220                     | 7<br>(0.28)    | 382<br>(0.14)    | 26<br>(0.58)   | 11475<br>(2.92)  | 19<br>(0.94)         | 11093<br>(8.91)  |

Appendix Table : 1 (contd.)

| Sl. No. | Industry Groups | 1960          |                  | 1975          |                  | Addition (1960 - 75) |                   |
|---------|-----------------|---------------|------------------|---------------|------------------|----------------------|-------------------|
|         |                 | Units         | Employment       | Units         | Employment       | Units                | Employment        |
| 14      | 231             | 96<br>(3.88)  | 63828<br>(23.73) | 184<br>(4.09) | 57776<br>(14.68) | 88<br>(4.34)         | - 6052<br>(-4.86) |
| 15      | 232             | 16<br>(0.65)  | 665<br>(0.25)    | 8<br>(0.18)   | 106<br>(0.03)    | - 8<br>(-0.39)       | - 559<br>(-0.45)  |
| 16      | 233             | 1<br>(0.04)   | 196<br>(0.07)    | 48<br>(1.07)  | 2324<br>(0.59)   | 47<br>(2.31)         | 2128<br>(1.71)    |
| 17      | 239             | 16<br>(0.65)  | 1756<br>(0.65)   | 8<br>(0.18)   | 91<br>(0.02)     | - 8<br>(-0.39)       | - 1665<br>(-1.34) |
| 18      | 241             | 39<br>(1.58)  | 3979<br>(1.48)   | 27<br>(0.60)  | 3928<br>(0.97)   | - 12<br>(-0.60)      | - 51<br>(-0.04)   |
| 19      | 242             | 1<br>(0.04)   | 14<br>(0.00)     | -<br>(-)      | -<br>(-)         | - 1<br>(-0.05)       | - 14<br>(-0.01)   |
| 20      | 243             | 2<br>(0.08)   | 202<br>(0.07)    | 11<br>(0.24)  | 300<br>(0.07)    | 9<br>(0.44)          | 98<br>(0.08)      |
| 21      | 250             | 23<br>(0.93)  | 1214<br>(0.45)   | 32<br>(0.71)  | 1561<br>(0.40)   | 9<br>(0.44)          | 347<br>(0.28)     |
| 22      | 260             | 12<br>(0.48)  | 454<br>(0.17)    | 8<br>(0.18)   | 250<br>(0.06)    | - 4<br>(-0.20)       | - 204<br>(-0.16)  |
| 23      | 271             | 14<br>(0.57)  | 1586<br>(0.59)   | 70<br>(1.56)  | 4402<br>(1.12)   | 56<br>(2.76)         | 2816<br>(2.26)    |
| 24      | 280             | 208<br>(8.41) | 9947<br>(3.70)   | 207<br>(4.60) | 17988<br>(4.57)  | - 1<br>(-0.05)       | 8041<br>(6.46)    |
| 25      | 291             | 81<br>(1.25)  | 3218<br>(1.20)   | 85<br>(1.89)  | 4210<br>(1.07)   | 54<br>(2.66)         | 992<br>(0.80)     |
| 26      | 292             | 5<br>(0.20)   | 166<br>(0.06)    | -<br>(-)      | -<br>(-)         | - 5<br>(-0.25)       | - 166<br>(-0.13)  |
| 27      | 300             | 5<br>(0.20)   | 56<br>(0.02)     | 106<br>(2.35) | 4472<br>(1.10)   | 101<br>(4.94)        | 4416<br>(3.20)    |

Appendix Table : 1 (contd.)

| Sl. Industry<br>No. Groups | 1960           |                 | 1975           |                 | Addition (1960 - 75) |                  |
|----------------------------|----------------|-----------------|----------------|-----------------|----------------------|------------------|
|                            | Units          | Employment      | Units          | Employment      | Units                | Employment       |
| 28 311                     | 24<br>(0.97)   | 2530<br>(0.94)  | 109<br>(2.42)  | 8706<br>(2.21)  | 85<br>(4.19)         | 6176<br>(4.96)   |
| 29 312                     | 1<br>(0.04)    | 15<br>(0.00)    | 16<br>(0.35)   | 600<br>(0.15)   | 15<br>(0.74)         | 585<br>(0.47)    |
| 30 319                     | 46<br>(1.86)   | 2129<br>(0.79)  | 136<br>(3.02)  | 6544<br>(1.66)  | 90<br>(4.44)         | 4415<br>(3.55)   |
| 31 321                     | 13<br>(0.52)   | 189<br>(0.07)   | 1<br>(0.02)    | 6<br>(0.00)     | - 12<br>(-0.59)      | - 183<br>(-0.15) |
| 32 322                     | 2<br>(0.08)    | 153<br>(0.06)   | -<br>(-)       | -<br>(-)        | - 2<br>(-0.10)       | - 153<br>(-0.12) |
| 33 331                     | 4<br>(0.16)    | 103<br>(0.04)   | 7<br>(0.15)    | 229<br>(0.06)   | 3<br>(0.15)          | 126<br>(0.10)    |
| 34 332                     | 191<br>(7.73)  | 14856<br>(5.52) | 260<br>(5.78)  | 37826<br>(9.61) | 69<br>(3.40)         | 22970<br>(18.45) |
| 35 333                     | 5<br>(0.20)    | 268<br>(0.10)   | 19<br>(0.42)   | 1694<br>(0.43)  | 14<br>(0.69)         | 1426<br>(1.14)   |
| 36 334                     | 1<br>(0.04)    | 1315<br>(0.49)  | 7<br>(0.15)    | 2809<br>(0.71)  | 6<br>(0.30)          | 1494<br>(1.20)   |
| 37 339                     | 49<br>(1.98)   | 1328<br>(0.49)  | 49<br>(1.09)   | 1282<br>(0.32)  | -<br>(-)             | - 46<br>(-0.03)  |
| 38 341                     | 83<br>(3.36)   | 5808<br>(2.16)  | 423<br>(9.40)  | 17828<br>(4.53) | 340<br>(16.78)       | 12020<br>(9.65)  |
| 39 342                     | 29<br>(1.17)   | 1124<br>(0.42)  | 70<br>(1.56)   | 7883<br>(2.00)  | 41<br>(2.02)         | 6759<br>(5.43)   |
| 40 350                     | 139<br>(5.62)  | 5432<br>(3.02)  | 462<br>(10.27) | 14710<br>(3.74) | 323<br>(15.94)       | 9278<br>(7.45)   |
| 41 360                     | 251<br>(10.15) | 13524<br>(5.03) | 267<br>(5.93)  | 14704<br>(3.73) | 16<br>(0.79)         | 1180<br>(0.95)   |
| 42 370                     | 17<br>(0.69)   | 827<br>(0.31)   | 125<br>(2.78)  | 9847<br>(2.50)  | 108<br>(5.33)        | 9020<br>(7.24)   |



Appendix Table : 1 (contd.)

| Sl. No. | Industry Groups | 1960          |                 | 1975          |                 | Addition (1960 - 75) |                   |
|---------|-----------------|---------------|-----------------|---------------|-----------------|----------------------|-------------------|
|         |                 | Units         | Employment      | Units         | Employment      | Units                | Employment        |
| 43      | 382             | 18<br>(0.73)  | 25305<br>(9.41) | 18<br>(0.40)  | 28712<br>(7.06) | -<br>(-)             | 3407<br>(2.47)    |
| 44      | 383             | 1<br>(0.04)   | 36<br>(0.01)    | 28<br>(0.62)  | 4304<br>(1.09)  | 27<br>(1.33)         | 4268<br>(3.43)    |
| 45      | 384             | 111<br>(4.49) | 13264<br>(4.93) | 157<br>(3.49) | 19443<br>(4.94) | 46<br>(2.27)         | 6179<br>(4.96)    |
| 46      | 385             | 15<br>(0.61)  | 493<br>(0.18)   | 45<br>(1.00)  | 2091<br>(0.53)  | 30<br>(1.48)         | 1598<br>(1.28)    |
| 47      | 386             | 3<br>(0.12)   | 208<br>(0.08)   | 3<br>(0.06)   | 383<br>(0.10)   | -<br>(-)             | 175<br>(0.14)     |
| 48      | 389             | 8<br>(0.32)   | 789<br>(0.29)   | -<br>(-)      | -<br>(-)        | - 8<br>(-0.39)       | - 789<br>(-0.63)  |
| 49      | 391             | 16<br>(0.65)  | 427<br>(0.16)   | 32<br>(0.71)  | 839<br>(0.21)   | 16<br>(0.79)         | 412<br>(0.33)     |
| 50      | 392             | 2<br>(0.08)   | 25<br>(0.01)    | 3<br>(0.06)   | 53<br>(0.01)    | 1<br>(0.05)          | 28<br>(0.02)      |
| 51      | 393             | 8<br>(0.32)   | 85<br>(0.03)    | 2<br>(0.04)   | 547<br>(0.14)   | - 6<br>(0.30)        | 542<br>(0.36)     |
| 52      | 394             | 1<br>(0.04)   | 21<br>(0.01)    | -<br>(-)      | -<br>(-)        | - 1<br>(-0.50)       | - 21<br>(-0.02)   |
| 53      | 395             | 16<br>(0.65)  | 1388<br>(0.52)  | 6<br>(0.13)   | 401<br>(0.10)   | - 10<br>(-0.49)      | - 987<br>(-0.79)  |
| 54      | 396             | 32<br>(1.29)  | 2106<br>(0.78)  | 20<br>(0.44)  | 959<br>(0.24)   | - 12<br>(-0.59)      | - 1147<br>(-0.92) |
| 55      | 399             | 60<br>(2.43)  | 4486<br>(1.67)  | 21<br>(0.47)  | 723<br>(0.18)   | - 39<br>(-1.92)      | - 3763<br>(-3.02) |
| 56      | 511             | 63<br>(2.55)  | 5098<br>(1.89)  | 57<br>(1.27)  | 10783<br>(2.65) | - 6<br>(-0.30)       | 5685<br>(4.57)    |

Appendix Table : 1 (contd.)

| Sl. No.               | Industry Groups | 1960         |                | 1975         |                | Addition (1960 - 75) |               |
|-----------------------|-----------------|--------------|----------------|--------------|----------------|----------------------|---------------|
|                       |                 | Units        | Employment     | Units        | Employment     | Units                | Employment    |
| 57                    | 512             | 3<br>(0.12)  | 212<br>(0.08)  | 6<br>(0.13)  | 130<br>(0.03)  | 3<br>(0.15)          | 82<br>(-0.06) |
| 58                    | 521             | 16<br>(0.65) | 1188<br>(0.44) | 55<br>(1.22) | 2012<br>(0.51) | 39<br>(1.92)         | 824<br>(0.66) |
| 59                    | 522             | 1<br>(0.04)  | 52<br>(0.02)   | -<br>(-)     | -<br>(-)       | 1<br>(-0.05)         | 52<br>(-0.04) |
| 60                    | 844             | 1<br>(0.04)  | 17<br>(0.01)   | 11<br>(0.24) | 196<br>(0.05)  | 10<br>(0.50)         | 179<br>(0.14) |
| Total<br>(whole U.P.) |                 | 2473         | 268970         | 4517         | 406940         | 2044                 | 137970        |

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Appendix Table : 2

Factories and Factory Employment in U.P. : 1960 & 1975

| Districts             | 1960         |                    | 1975         |                    | Addition<br>(1960-75) |                    | (1)   |
|-----------------------|--------------|--------------------|--------------|--------------------|-----------------------|--------------------|-------|
|                       | Units<br>(1) | Em ployment<br>(2) | Units<br>(3) | Em ployment<br>(4) | Units<br>(5)          | Em ployment<br>(6) |       |
| <u>Eastern Region</u> |              |                    |              |                    |                       |                    |       |
| Allahabad             | 117          | 8269               | 137          | 13505              | 20                    | 5236               | 4.73  |
| Azamgarh              | 4            | 323                | 48           | 2093               | 44                    | 1770               | 0.16  |
| Bahraich              | 33           | 1148               | 29           | 1051               | 4                     | 97                 | 1.35  |
| Ballia                | 3            | 67                 | 2            | 138                | 1                     | 71                 | 0.12  |
| Basti                 | 10           | 2410               | 11           | 2289               | 1                     | 121                | 0.40  |
| Deoria                | 20           | 9330               | 21           | 8206               | 1                     | 1124               | 0.81  |
| Faizabad              | 15           | 1387               | 19           | 1641               | 4                     | 254                | 0.61  |
| Ghazipur              | 3            | 674                | 7            | 843                | 4                     | 169                | 0.12  |
| Gonda                 | 27           | 2191               | 21           | 2711               | 6                     | 520                | 1.09  |
| Gorakhpur             | 46           | 14587              | 64           | 16003              | 18                    | 1416               | 1.86  |
| Jaunpur               | 10           | 927                | 15           | 618                | 5                     | 309                | 0.40  |
| Mirzapur              | 31           | 3565               | 46           | 12355              | 15                    | 8790               | 1.25  |
| Pra tagarh            | 1            | 36                 | 4            | 101                | 3                     | 65                 | 0.04  |
| Sul tam pur           | 2            | 66                 | 4            | 150                | 2                     | 84                 | 0.08  |
| Varanasi              | 122          | 7642               | 195          | 11267              | 73                    | 3625               | 4.93  |
| TOTAL                 | 444          | 52622              | 623          | 72971              | 179                   | 20349              | 17.96 |

Appendix Table

| Districts                 | (1) | (2)   | (3)  | (4)    | (5)   | (6)  |
|---------------------------|-----|-------|------|--------|-------|------|
| <u>Central Region</u>     |     |       |      |        |       |      |
| Barabanki                 | 5   | 1112  | 6    | 1096   | 1 -   | 16   |
| Fatehpur                  | 10  | 260   | 13   | 313    | 3     | 53   |
| Hardoi                    | 4   | 690   | 3    | 1037   | -     | 347  |
| Kanpur                    | 362 | 69259 | 626  | 68175  | 264 - | 1084 |
| Lucknow                   | 165 | 22247 | 232  | 27669  | 67    | 5422 |
| Raibareilly               | 1   | 14    | 7    | 1007   | 6     | 993  |
| Sitapur                   | 16  | 3437  | 36   | 4009   | 20    | 572  |
| Unnao                     | 6   | 652   | 47   | 2272   | 41    | 1620 |
| Kheri                     | 20  | 2278  | 38   | 1174   | 18 -  | 1104 |
| TOTAL                     | 539 | 99948 | 1008 | 106752 | 419   | 6803 |
| <u>Bundelkhand Region</u> |     |       |      |        |       |      |
| Banda                     | 13  | 194   | 4    | 67     | - 9 - | 127  |
| Hamirpur                  | 2   | 159   | 1    | 82     | - 1 - | 77   |
| Jalaun                    | 3   | 73    | 3    | 83     | -     | 10   |
| Jhansi                    | 37  | 4257  | 43   | 12474  | 6     | 8187 |
| TOTAL                     | 55  | 4713  | 51   | 12706  | - 4   | 7993 |

Appendix Table : 2 (contd.)

| Districts          | (1) | (2)  | (3) | (4)   | (5) | (6)  |
|--------------------|-----|------|-----|-------|-----|------|
| <u>Hill Region</u> |     |      |     |       |     |      |
| Almora             | 3   | 524  | 5   | 245   | 2   | 279  |
| Pithoragarh        | -   | -    | 1   | 20    | 1   | 20   |
| Dehradun           | 40  | 3955 | 96  | 8339  | 48  | 4446 |
| Garhwal            | 3   | 200  | 6   | 136   | 3   | 64   |
| Chamoli            | -   | -    | -   | -     | -   | -    |
| Nainital           | 26  | 2239 | 43  | 4044  | 17  | 1805 |
| Tehri Garhwal      | 3   | 139  | 1   | 17    | -   | 122  |
| Uttar Kashi        | -   | -    | 1   | 250   | 1   | 250  |
| TOTAL              | 83  | 7055 | 153 | 13111 | 70  | 6056 |



Appendix Table

| Districts             | (1)  | (2)    | (3)  | (4)    | (5)  |
|-----------------------|------|--------|------|--------|------|
| <u>Western Region</u> |      |        |      |        |      |
| Agra                  | 330  | 18240  | 558  | 44925  | 168  |
| Aligarh               | 132  | 2093   | 205  | 13113  | 73   |
| Bijnor                | 47   | 4471   | 260  | 12088  | 213  |
| Badam                 | 9    | 199    | 15   | 657    | 6    |
| Bareilly              | 65   | 6478   | 82   | 9781   | 17   |
| Bulandshahar          | 32   | 1561   | 16   | 1194   | - 16 |
| Etah                  | 6    | 977    | 16   | 1068   | 10   |
| Etawah                | 38   | 937    | 52   | 1853   | 14   |
| Farrukhabad           | 34   | 1102   | 30   | 996    | - 4  |
| Mainpuri              | 25   | 3476   | 32   | 1995   | 7    |
| Mathura               | 28   | 1275   | 69   | 2055   | 41   |
| Meerut                | 211  | 30221  | 710  | 57271  | 499  |
| Moradabad             | 58   | 4317   | 167  | 10286  | 109  |
| Muzaffarnagar         | 98   | 6220   | 252  | 15348  | 154  |
| Rampur                | 8    | 2070   | 29   | 2506   | 21   |
| Pilibhit              | 5    | 1989   | 7    | 2232   | 2    |
| Saharanpur            | 82   | 10301  | 131  | 19196  | 49   |
| Shahjahanpur          | 33   | 1798   | 80   | 3929   | 47   |
| TOTAL                 | 1301 | 104725 | 2711 | 200493 | 1410 |